THE HUMANE SOCIETY OF THE UNITED STATES

Why Hunting Won't Reduce Human Risk of Lyme Disease

Often we hear a rallying cry that a deer hunt is needed to reduce the devastating effects of Lyme disease. Fear of this disease, and anger about our inability to control it, spur near-hysteria in some communities. However, hunting deer will not protect people from Lyme disease. Below are the reasons why.

How Lyme disease works:

The culprit in the spread of Lyme disease is *Ixodes scapularis*, the Black-legged tick which carries a disease-causing bacterium (*Borrelia burgdorferi*) in its bloodstream. The tick transforms from a larvae into a nymph and then an adult over a 2 year span. At each stage, the tick takes a blood meal while injecting bacterium into a new host -- and then drops off and molts into the next life stage.

Killing one host won't stop a multi-host disease:

- The black-legged tick is carried on many popular bird species, lizards and all mammals. Deer are a preferred host for *adult* ticks, small rodents like white-footed mice are the primary host for *immature* ticks. Birds transport the disease to new areas.
- Ticks confound deer reduction efforts by switching to other hosts (Duffy et al, 1994) or congregating at higher densities on the remaining deer (Deblinger et al, 1993).
- At one time, the Black-legged tick was called a "deer tick." This common name was a misnomer due to tick's multiple hosts. Overall, killing one host in a multi-host disease is an exercise in futility.

Less Ticks Don't Necessarily Mean Less Disease!

- The CDC did a stuy of 2,500 yards in Connecticut, Maryland and New York which were sprayed with either bifenthrin (a tick-killing insecticide) or a placebo. Participants were asked to detail tick bites and encounters through 4 monthly surveys. The result was that ticks decreased 60% in sprayed yards. However, there was no difference between those *whose yards received pesticide and those who got placebo in term of:* 1) Ticks found crawling on them, 2) Ticks found biting them and 3) Incidences of tick-borne disease

- The study's conclusion was that: 1) Reduced tick density does not necessarily mean less human disease and 2) People don't necessarily pick up Lyme disease in their own backyards.

Larger Issue:

- The point is NOT if killing deer will reduce tick numbers ….
- But will hunting reduce tick density and infectivity *enough* to lower transmission of disease in people?

Health authorities don't recommend killing deer to control Lyme disease

There's good reason that the Centers for Disease Control (CDC), World Health Authority (WHA) and state health departments *don't recommend hunting* to control this devastating disease. If hunting worked, health authorities would recommend it. See the following website for advice on how people can protect themselves from this disease http://www.cdc.gov/lyme/

Leading experts underscore why hunting won't work:

- **Dr. Tamara Awerbuch of the Harvard School of Public Health**: As deer are killed, "you would simply have more ticks per deer because the surface area of each is enough to support many ticks. Just killing deer won't do the job" (*Killing Deer Not the Answer to Reducing Lyme Disease*, HSPH newsletter, *2010).* http://www.hsph.harvard.edu/news/features/features/kiling-deer-not-answer-reducing-lyme-disease.html

- **Proceedings of the National Academy of Sciences**: *"Increases in Lyme disease in the northeastern and Midwestern United States over the past three decades are frequently uncorrelated with deer abundance and instead coincide with a range-wide decline of a key small-mammal predator, the red fox...* " (Levi et al, 2012)

- **Dr. Richard Ostfeld of the Institute for Ecosystem Studies**: A scientific study – and entire book on Lyme disease -- confirms that *human risk of exposure to Lyme disease is correlated with the abundance of immature (rodent) hosts and their food resources, not deer numbers* (Ostfeld et al, 2006, 2011).

Hunting doesn't reduce enough ticks or tick reproduction

- In one study where as many as 70% if the deer were removed from an island, there was "no marked reduction in the abundance of the tick." (Wilson et al, 1984, p.697)

- After reducing the deer population 83% (350 to 60 deer) over a 7 year period, immature ticks did decline – but soon increased again to pre-hunt levels, despite the vastly reduced deer density. Interesting, *adult* tick numbers *increased* the entire time. (Wilson and Deblinger, 1993, Ostfeld, 2011). The authors concluded that "the reduction in tick numbers was insufficient to reduce the number of female ticks that reproduced." (Deblinger et al, 1993, p.148)

Hunting season is poorly timed to affect tick reproduction. By the time regular hunting season occurs in November, a good portion of adult ticks have already mated and *dropped off* the deer to lay eggs. Deer reduction practices carried out when adult ticks are relatively inactive at the end of fall will have minimal impact on the tick population." (Falco and Daniels in McShea, 1997)

How low do deer numbers need to go? It appears that a deer population level would need to be extremely low, close to zero, to impact the transmission dynamics of Lyme disease. The few cases where Lyme disease was reportedly reduced by hunting were small island or isolated populations where deer could be eradicated or nearly eradicated --- *and there were hardly any deer (or none!) in the surrounding community to take their place*. In non-island areas any reduction in deer numbers is quickly offset by an increase in the remaining deer's reproductive rate – and influx of deer from the surrounding area.

Safety issues:

- One key study (Perkins et al, 2006) suggests that a local absence of deer may actually *increase* tick feeding on rodents, which can lead to the potential for disease "hot spots."

- Researchers warn that hunting may actually *increase* the public safety risk in the short-term because any remaining ticks who are still "questing" for a large host are more likely to end up on large hosts like humans after deer numbers have been reduced (Ginsberg and Zhioua, 1999).

Tools for tick control

- Some of the best ways to control human Lyme disease involve doing a combination of the following: checking oneself and family members for tick after being outdoors, taking precautions like wearing light-colored clothing, tucking in sleeves and socks, using tick-repelling products on your skin and insecticidal sprays on properties, doing habitat alteration to reduce tick and tick-host habitat, and consulting a doctor immediately when signs of Lyme disease or the characteristic rash occur.

- **The *4-Poster***: This device that *uses the deer* to kill ticks (Pound, 2000). This device has been tested by the USDA in a 5 state, 7 year research program and has proven extremely effective in reducing tick numbers (McGraw and McBride, 1991). It contains a corn bait, which attracts deer, and when they eat the corn, a chemical (10% permethrin) is applied to their necks and shoulders which kills 95%-98% of the adult ticks. A study done at the Goddard Flight Center found that by using the 4-Poster system, adult ticks were completely eliminated by the 2nd year of the study; all stages were reduced 91-100% by year 3 (Solberg et al, 2003).

- ***Damminix Tick Tubes*** consist of cardboard tubes filled with permethrin-treated cotton balls which mice use for nesting material. The ticks that feed on mice in the spring and fall are exposed to permethrin and killed. This product is commercially available and well suited to a property-level approach.

Summary:

The human risk of Lyme disease won't be lessened by reducing deer numbers, based on many scientific studies. There are far better strategies for reducing human risk, improving human safety, and controlling the spread of this multi-host disease.

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